REMARKS

By this paper, the Applicant has amended Claims 1, 31, 38, 39, 82, 84-85, 87-89, 91, 93, 95, and 98-99. Claim 32 has been canceled. Claims 100-104 have been added. Hence, Claims 1-25, 31, 33, 37-39, and 82-104 remain pending and are presented for further examination.

I.   Advisory Action of July 19, 2007

In an Advisory Action of July 19, 2007, the Examiner noted that the rejection based on 35 U.S.C. § 112 had been withdrawn. With respect to the rejection of claims under § 101, the Examiner seemed to indicate that the Specification did not support the phrase "medical condition" as required under § 112. Applicant submits that the phrase "medical condition" is fully supported by the specification. However, in order to advance prosecution, Applicant has replaced the term "condition" with "event" in the claims. Applicant submits that while this amendment may change the scope of the claims, such amendment does not narrow the scope of the claims.

With respect to the rejections under § 102 and § 103, the Examiner did not enter Applicant's after-final amendments for consideration in the Advisory Action. Applicant notes that the present amendments to the claims differ from those that were not entered. Hence, Applicant now requests reconsideration and withdrawal of the outstanding rejections for the reasons set forth below. Rejections of Claims 1-25, 31-33, 37, 39, 82-85, 87-91, and 93-96 under 35 U.S.C. § 101

On page 3 of the Office Action, the Examiner rejected Claims 1-25, 31-33, 37, 39, 82-85, 87-91, and 93-96 under 35 U.S.C. § 101 as being drawn to nonstatutory subject matter. Applicant respectfully disagrees with these rejections for the reasons set forth below.

Applicant respectfully submits computer-related inventions are directed to patentable subject matter so long as the "claimed invention "transforms" an article or physical object to a different state or thing." See USPTO Interim Guidelines for Examination of Patent Applications (O.G. Notices, November 22, 2005). See, e.g., In re Lowry, 32 F.3d 1579, 1583-84, (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory). Applicant respectfully submits that each of Claims 1-25, 31, 33, 37, 39, 82-85, 87-91, and 93-96 recite such a transformation.

For example, Claim 1 recites a method comprising "collecting at least one training case in the medical instrument, wherein the training case has an input state indicative of at least a portion of a first biomedical signal of a particular patient and a corresponding output value indicative of a medical event of the particular patient," "receiving a second biomedical signal of the particular patient in the medical instrument," "identifying a medical event of the particular patient based the output of the neural network ," "applying the second biomedical signal to the reconfigured neural network to generate an output of the neural network," and "generating an output signal based on the identified event. In other words, Claim 1 recites a method of transforming biomedical signals of a particular patient into output "data indicative of [an] identified medical event of the particular patient." Claims 89 and 99 recite systems that similarly transform biomedical signals. Similarly, Claim 31 recites a method that transforms input states and outputs "data indicative of the second output value" "indicative of a classification of a second input state." Thus, Applicant submits that independent Claims 1, 31, 89 and 99 do recite patentable subject matter. As each of Claims 2-25, 33, 37, 39, 83-85, 90, 91, 94-96 depend from one of Claims 1, 31, 89 and 99, Applicant submits that the dependent claims also are patentable for at least the same reasons.

II.   Rejections of Claims 1, 2, 31-33, 37, 39, 82, 85, 87-89, 93, and 99 under 35 U.S.C. § 102

On pages 5-14 of the Office Action, the Examiner rejected Claims 1, 2, 31-33, 37, 39, 82, 85, 87-89, 93, and 99 as anticipated under 35 U.S.C. § 102 by the publication "Personal Computer System for ECG Recognition in Myocardial Infarction Diagnosing Based on an Artificial Neural Network," hereinafter referred to as "Elias." The rejections are discussed below. For the reasons set forth below, Applicant respectfully submits that Claims 1, 2, 31, 33, 37, 39, 82, 85, 87-89, 93, and 99, are patentable.

A.   Brief Description of One Embodiment

One embodiment comprises a method and system in which training data that includes biomedical signal data associated with medical events of a *particular patient* is used to train a neural network that recognizes signal patterns of the *particular patient* associated with particular medical events in that *particular patient*. For example, the Specification recites:

> In addition to being inefficient, applying this conventional process to the analysis
> of biomedical signals from a single patient is uneconomical. In order to combat
> the above problems, the systems and methods described herein provide an

optimized neural network capable of learning, in real-time, patient states from biomedical signals, with a high degree of reliability.

Specification (as published), para. [0007] and [0008]. In particular, "in an embodiment used to detect medical events, users can customize a neural network to recognize signal patterns that are specific to *particular patient*, or patterns characteristic of entirely new classes of events such as a research project investigating EEG signal patterns of previously uncharacterized medical states." *Specification* (as publication) paragraph [0009]. Thus, one embodiment "provides an optimized neural network capable of learning, in real-time, patient states from biomedical signals, with a high degree of reliability" that can "recognize signal patterns that are specific to *particular patient*." *Specification* (as published) paragraphs [0007]-[0009].

B.   Discussion of Rejection of Independent Claims 1, 82, 89, 93, and 99 under 35 U.S.C. § 102

The Examiner rejected Claims 1, 82, 89, 93, and 99 as being anticipated by Elias under 35 U.S.C. § 102. However, Applicant submits that Elias fails to teach at least *"reconfiguring* a neural network in the medical instrument based on at least one training case of the *particular patient"* as recited in Claim 1. Rather, Elias discloses creating a neural network based on a database that includes ECG "measurements plus patient age and sex [to] form an neural network input vector." *Elias*, 1095 at col. 1. "Neural Network is being entrained whit [sic] the data base mentioned above and once concluded the training process the whole system will be tested in a Medical Center in order to evaluate his (sic) performance." *Elias* at 1096. Elias continues that "[t]he whole system will be tested in a medical center with signals token (sic) to confined *patients."* *Elias*, col. 2, lines 12-13. (Applicant notes that the Elias discloses testing on "patients," plural, and thus fails to teach training and testing on a singular patient as the Examiner suggested in the Advisory Action.) Further, Elias states that "[p]artial results have been obtained, although the neural network learning process has been concluded." *Elias*, col. 2, lines 4-5. Thus, Elias discloses training a network on a database of data, *"concluding* the learning process," and "test[ing] in a medical center." *Id.* (emphasis added). Nowhere does Elias teach or render obvious a method comprising *"reconfiguring* a neural network stored in the medical instrument based on at least one training case of the particular patient" and "applying the second biomedical signal [of the particular patient] to the *reconfigured* neural network to

generate an output of the neural network" as recited in Claim 1. Accordingly, Applicant submits that Claim 1, as amended, is patentable.

Similarly, Claim 82 recites "identifying a portion of the signal that is indicative of a medical event of the particular patient based on user input" and "reconfiguring a predictive model stored in a memory of an electronic device for identifying a subsequent medical event of the particular patient based on an additional biomedical signal of the patient." Claim 89 recites a system comprising a processor configured to "reconfigure the stored neural network based on the at least one training case of the particular patient." Claim 93 recites a system comprising a processing means configured to "reconfigure the stored neural network based on the at least one training case of the particular patient." Claim 99 recites "reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient." Applicant submits that Elias also fails to teach or render obvious these features for at least the same reasons discussed with reference to Claim 1. Accordingly, Applicant submits that each of Claims 1, 82, 89, and 99 are patentable in view of Elias.

C.   Discussion of Rejection of Independent Claim 31

On page 7 of the Office Action, the Examiner rejected Claim 31 as being anticipated by Elias. The Examiner argued that Elias discloses "reconfiguring the neural network to correctly classify the first training case without retraining the neural network" because Elias teaches reconfiguring the neural network by adjusting the weight of each node.

However, Applicant notes that the Specification recites that "'Retraining' as used herein refers generally to any process for incorporating new training cases into a classification system that requires nontrivial computation. Within the context of a MLP (multilayer perceptron), "retraining" specifically refers to the iterative propagation process referred to above." *Specification* (as published) paragraph [0033]. "As is known to persons of ordinary skill in the art, MLP training consists of numerous iterations of propagation algorithms through all of the training cases, requiring high amounts of processing time. MLP's do not support incremental learning, meaning training on new training cases but not old, because the link weights in an MLP are updated a very small amount in each iteration." *Id.*

However, nowhere does Elias disclose any type of retraining. Rather, as noted above, Elias merely discloses that a "Neural Network is being entrained whit [sic] the data base

mentioned above and once concluded the training process the whole system will be tested in a Medical Center in order to evaluate his (sic) performance." *Elias* at 1096. In particular, Elias discloses using a MLP such as "a three layer backpropagation neural network" for which retraining would include the very "iterative propogation" that the Specification refers to as "retraining." *Elias* 1096. Accordingly, Applicant submits that Elias fails to teach or render obvious "reconfiguring the neural network to correctly classify the first training case without retraining the neural network" as recited by Claim 31. Moreover, Claim 31, as amended, recites that "reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case." Applicant respectfully submits that not only does Elias fail to disclose reconfiguring in general, it also fails to teach or suggest that "reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case" as recited by Claim 31, as amended. Accordingly, Applicant submits that Claim 31 is patentable over Elias.

As each of Claims 2, 33, 37, 39, 85, 87, and 88 depends from one of Claims 1, 31, 82, 89, 93, or 99, the Applicant submits that each of those claims is patentable for at least the same reasons discussed above with reference to Claims 1, 31, 82, 89, 93, and 99.

III.   Rejections of Claims 3-25, 38, 83, 84, 90-92, and 94-98 under 35 U.S.C. § 103(a)

On pages 14-36 of the Office Action, the Examiner rejected Claims 3-25, 38, 83, 84, 90-92, and 94-98 under 35 U.S.C. § 103(a) as being rendered obvious by Elias in combination with other references. However, each of Claims 3-25, 38, 83, 84, 90-92, and 94-98 depends from one of Claims 1, 31, 82, 89, or 93 , the Applicant submits that each of those claims is patentable for at least the same reasons discussed above with reference to Claims 1, 31, 82, 89, and 99.

IV.   Discussion of Claim 86

On page 2 of the Office Action, the Examiner objected to Claim 86 as depending on rejected Claim 82. In the Advisory Action, the Examiner indicated that Claim 86 was rejected. As discussed above, Applicant submits above that Claim 82 is patentable. Hence, Applicant respectfully submits that Claim 86 is allowable in its current form.

V. Conclusion

Applicant has endeavored to address all of the Examiner's concerns as expressed in the Office Action. Accordingly, amendments to the claims, the reasons therefor, and arguments in support of patentability of the pending claim set are presented above. Any claim amendments which are not specifically discussed in the above remarks are made in order to improve the clarity of claim language, to correct grammatical mistakes or ambiguities, and to otherwise improve the clarity of the claims to particularly and distinctly point out the invention to those of skill in the art. Finally, Applicant submits that the claim limitations above represent only illustrative distinctions. Hence, there may be other patentable features that distinguish the claimed invention from the prior art.

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, the Applicants are not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that the Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections and, particularly, that all claims be allowed. If the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, the Examiner is respectfully invited to call the undersigned.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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